

16. (Withdrawn) A process for identifying material which is suitable for producing heat-treated foods having a reduced acrylamide content, comprising:

a) determining the content of soluble sugars and/or amino acids of the plant material which is suitable for producing heat-treated foods; and

b) selecting such plant material according to process step a) which, compared with corresponding conventional plant material, has a reduced content of soluble sugars and/or amino acids.

17. (Currently amended) The process according to Claim [[1]] 5, wherein said pre-cooked meals are baby food.

18. (Previously presented) The method according to Claim 14, wherein said pre-cooked meals are baby food.

19. (New) The process according to Claim 1, wherein said genetically modified plant material is cold-stored before processing.

20. (New) The process according to Claim 19, wherein said genetically modified plant material is cold-stored at 4°C.

21. (New) The method according to Claim 12, wherein said genetically modified plant material is cold-stored before processing.

22. (New) The method according to Claim 21, wherein said genetically modified plant material is cold-stored at 4°C.

REMARKS

Status of the Claims

Claims 1-5, 8-14, and 16-22 are pending. Claims 1, 8, 12, and 17 are amended. Claim 16 is withdrawn. Claims 19-22 are newly added. Claims 6 and 7 are canceled herein without prejudice or disclaimer. Applicants reserve their right to file divisional and/or continuation application(s) directed to the canceled subject matter. Support for the amendments and new claims may be found throughout the application as originally filed.²

Specification

The USPTO objects to the specification's purported use of an embedded hyperlink and/or other form of browser-executable code.³

Applicants have amended the specification to remove the purported embedded hyperlink and/or other form of browser-executable code. Accordingly, this objection has been overcome.

Claim Rejections Under 35 U.S.C. § 112, First Paragraph

Claims 6-8 stand rejected under 35 U.S.C. § 112, first paragraph as allegedly failing to comply with the written description rejection.⁴ Specifically, the USPTO contends that “[t]he claims are drawn to multitudes of unspecified genetic modifications and foreign nucleic acids that would lead to a reduction in the expression of the R1 protein,” but the specification “only describes the use of sequences from the R1 gene itself for reducing the expression of the R1 gene.”⁵

As an initial matter, Applicants note that claim 1 has been amended to incorporate the limitations of claims 6 and 7. To the extent the rejection still applies, Applicants respectfully traverse.

The claims are directed to processes for reducing the acrylamide content of heat-treated foods comprising selecting and processing genetically modified plant material that has a reduced activity of one or more endogenous R1 proteins and has a reduced content of soluble sugars.

² See Specification, page 15, lines 15-21; original claims 6-7; Examples.

³ See Office Action, page 2.

⁴ See *id.* at pages 2-5.

⁵ *Id.* at page 3.

The specification adequately describes the full scope of the claims. First, R1 proteins are known in the art and are characterized in the specification.⁶ Second, the specification teaches various methods that reduce the activity of R1 proteins and the content of soluble sugars.⁷ Third, the specification teaches various methods of measuring the reduction of R1 activity and the content of soluble sugars.⁸ Accordingly, in view of the specification and knowledge in the art, one of skill in the art would understand that the inventors were in possession of the claimed invention.

In *Capon v. Esbar*, the Federal Circuit held that claims to chimeric DNA produced by selecting and combining known DNA segments using known DNA-linking procedures were adequately described, even though the specification did not disclose the sequence of at least one chimeric DNA.⁹ The court noted that written description requirement “must be applied in the context of the particular invention and the state of the knowledge.”¹⁰ Indeed, the court considered the parties’ characterization of their inventions:

Both parties explain that their invention is not in discovering which DNA segments are related to the immune response, for that is in the prior art, but in the novel combination of the DNA segments to achieve a novel result.¹¹

The court held that, in view of this characterization and the state of the art, the Board erred in holding that the specification does not meet the written description requirement.¹²

In the instant case, the claimed invention is not the reduction of R1 activity *per se*. As discussed above, R1 proteins, methods of reducing R1 activity, and methods of measuring the reduction of R1 activity are known and described. Rather, the claims relate to the reduction of soluble sugars by reducing R1 activity and the unexpected finding that plant material having a reduced content of soluble sugars permits the production of foods which, after heat treatment, have a reduced acrylamide content. Applicants submit that, in view of this characterization and the

⁶ See, e.g., Specification, page 13, line 28 to page 14, line 15.

⁷ See *id.* at pages 11-13 and 19-28.

⁸ See *id.* at page 17, line 13 to page 18, line 2; page 37; Example 2.

⁹ *Capon v. Esbar*, 76 USPQ 2d 1078, 1082-1083 (Fed. Cir. 2005).

¹⁰ *Id.* at 1084.

¹¹ *Id.* at 1085.

¹² *Id.*

knowledge in the art, the instant specification, like the specifications in *Capon*, provides adequate written description for the full scope of the claims.

In view of the foregoing, Applicants respectfully request withdrawal of this rejection.

Claim Rejections Under 35 U.S.C. § 112, Second Paragraph

Claim 17 stands rejected under 35 U.S.C. § 112, second paragraph as allegedly being indefinite.¹³ Specifically, the USPTO asserts that there is insufficient antecedent basis for the recitation of “said pre-cooked meals” in claim 17, which depends from claim 1.¹⁴

Applicants have amended claim 17 to depend from claim 5, which recites “pre-cooked meals.” Accordingly, this rejection has been overcome.

Claim Rejections Under 35 U.S.C. § 103(a)

Claims 1-6, 10-14, and 17-18 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Pub. No. 2002/0019998 (“Sonnewald”) in view of WO 9740707 (“Walsh”).¹⁵

As amended, the claims are directed to processes for reducing the acrylamide content of heat-treated foods comprising selecting and processing genetically modified plant material that has a reduced activity of one or more endogenous R1 proteins and has a reduced content of soluble sugars.

Neither Sonnewald nor Walsh teaches or suggests such a method. Indeed, among other things, these references alone, or in combination, do not teach or suggest reducing the activity of one or more endogenous R1 proteins, let alone reducing R1 activity to reduce the content of soluble sugars.¹⁶ Accordingly, because the references do not teach or suggest each and every claim element, Applicants respectfully request withdrawal of this rejection.

¹³ See Office Action, page 5.

¹⁴ See *id.*

¹⁵ See *id.* at pages 5-7.

¹⁶ See *id.* at page 7 (“...nor does Sonnewald teach the reduction in expression of the R1 gene in potato.”).

Claims 1-14 and 17-18 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Sonnewald in view of U.S. Pat. No. 6,521,816 ("Frohberg") and further, in view of Walsh.¹⁷

As discussed above, Sonnewald and Walsh alone, or in combination, fail to teach or suggest reducing the activity of one or more endogenous R1 proteins, let alone reducing R1 activity to reduce the content of soluble sugars. To supply these missing teachings, the USPTO relies on Frohberg, and contends that Frohberg teaches that "cold sweetening" leads to a reduction in sugars in the resulting plant material.¹⁸

Applicants respectfully traverse.

As an initial matter, Applicants point out that Frohberg merely states that there is an interest in improving starches such that they show a reduced "cold sweetening," i.e., a decreased release of reduced sugars during long term storage at low temperatures. Frohberg does not, however, present a solution to solve this problem. Indeed, nowhere does Frohberg teach or suggest that modulating endogenous R1 activity reduces "cold sweetening" or sugar content. Rather, Frohberg teaches that R1 overexpression results in starch with a higher phosphate content:

Due to the expression or the additional expression of a nucleic acid molecule of the invention, the transgenic plant cells and plants of the invention synthesize a starch which is modified when compared to starch from wildtype-plants, i.e. non-transformed plants. In particular, such a starch has preferably a higher phosphate content than starch synthesized by corresponding non-transformed cells or plants...Starches with a high content of phosphate can show an increased paste clarity and are of particular interest for the food industry and for the paper industry, e.g., for the preparation of the surface of paper.¹⁹

Frohberg also teaches that reducing the amount of R1 protein results in starch with reduced phosphate content:

Due to the expression of the described DNA molecules encoding antisense RNA, a ribozyme or a cosuppression RNA in the transgenic plant cells the amount of proteins encoded by the DNA molecules of the invention which are present in the cells in endogenic form, is reduced. Preferably, this reduction leads to a drastic change of the physical and chemical properties of the starch synthesized in the plant cells. When compared to starch from non-transformed cells or plants the modified starch preferably exhibits altered pastification properties, i.e. an altered viscosity of the watery solutions of the starch and/or an altered, in particular a reduced phosphate content.

¹⁷ See *id.* at pages 7-8.

¹⁸ See *id.* at page 8.

¹⁹ Frohberg, col. 9, lines 24-42. (emphasis added).

As shown above, Frohberg discloses that starches with a high content of phosphate show an increased paste clarity and starches with a reduced phosphate content exhibit altered pastification properties, i.e. an altered viscosity of the watery solutions. Frohberg fails to teach, suggest, or present any evidence that the obtained starches show a reduced “cold sweetening” or sugar content. Frohberg is also silent with respect to reducing acrylamide content in heat-treated foods. Accordingly, Frohberg does not remedy the deficiencies of Sonnewald and Walsh, nor would one of ordinary skill in the art have a reason to combine Frohberg with Sonnewald and Walsh to arrive at the claimed methods for reducing acrylamide content of heat-treated foods.

Even assuming one of skill in the art would have combined Frohberg, Sonnewald, and Walsh, which they would not, the specification teaches unexpected results. As discussed in the specification, methods for reducing acrylamide content of heat-treated foods were unknown before the filing date of the instant application.²⁰ The inventors unexpectedly discovered that the choice of starting plant material is significant for reducing acrylamide content:

It has now surprisingly been found that the choice of the starting plant material which is used to produce heat-treated foods has a critical effect on the acrylamide content of such foods. The invention teaches for the first time that the use of plant material which, compared with corresponding conventional plant material, has a reduced content of soluble sugars and/or amino acids permits the production of foods which, after heat treatment, have a lower acrylamide content than in the case of the use of plant material having conventional contents of soluble sugars and/or amino acids.²¹

Therefore, even assuming the USPTO established a *prima facie* case of obviousness, which it has not, Applicants respectfully submit that the unexpected results disclosed in the specification rebut the purported *prima facie* case.

In view of the foregoing, Applicants respectfully request withdrawal of this rejection.

²⁰ See Specification, page 3, lines 16-17 (“Processes for minimizing acrylamide contents in heat-treated foods have not yet been described to date in the prior art and are urgently required.”)

²¹ *Id.* at page 9, lines 22-30.



CONCLUSION

In view of the above remarks, early notification of a favorable consideration is respectfully requested. An indication of allowance of all claims is respectfully requested.

If the Examiner has any questions relating to this response or the application in general, then he is respectfully requested to contact the undersigned so that prosecution of this application may be expedited.

Respectfully submitted,

HUNTON & WILLIAMS LLP

 
By: Reg No. 35,984 for

Robert M. Schulman
Registration No. 31,196

Alexander H. Spiegler
Registration No. 56,625

Hunton & Williams LLP
Intellectual Property Department
1900 K Street, N.W., Suite 1200
Washington, DC 20006-1109
(202) 955-1500 (telephone)
(202) 955-1899 (direct telephone)
(202) 778-2201 (facsimile)
RMS/AHS